

## RESEARCH NOTE

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SURVIVAL AND GROWTH OF BAGGED AND  
BAREROOTED HONDURAS PINE, CADAM, AND PRIMAVERABy  
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For experimental plantings seedlings are normally planted in polyethylene bags to insure high survival. To determine whether Honduras pine, cadam, and primavera can be planted barerooted plants were raised in bags but at time of planting the potting material was removed from around the roots of half the plants. The Honduras pines selected were not in flush. Plantings were in a valley at about 150 feet elevation and on a nearby mountain at about 1500 feet.

After 6 months survival was 90% or more except for bagged primavera, but this was thought to be lack of adaptability rather than response to the treatment. The growth after 23 weeks and 23 months failed to show any difference between the bare-rooted and the bagged seedlings, but the growth of the cadam was superior to that of the Honduras pine.

Resumen

Para las plantaciones con fines experimentales los arbolitos se propagan en bolsas de tela plástica de polietileno para asegurar la necesaria alta supervivencia. Para plantaciones en mayor escala sería conveniente utilizar plantas a raíz desnuda. Nos interesa especialmente el uso de plantas de pino a raíz desnuda que no muestren brotes tiernos al

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tiempo de plantarse.

Se usaron dos localidades una un valle a 150 pies de elevación y otra de montaña a aproximadamente 1500 pies. Ambos sitios reciben 100 pulgadas o más de lluvia anualmente aunque hicimos la plantación durante la época más seca del año.

En cada localidad se plantaron 20 plantas de cada especie. Al momento de plantar, a la mitad se le removió el material donde crecía la planta en la bolsa y los arbolitos se plantaron a raíz desnuda. A la otra mitad no se le removió el material de enraizamiento.

A los 6 meses los datos mostraron una supervivencia de más de 90% para todas las especies y para ambos sistemas de plantación excepto para la primavera en bolsas en el valle lo cual se adjudicó más a competencia de malezas y la falta de adaptabilidad que al tratamiento en sí. El crecimiento ni al cabo de 23 semanas ni a los 23 meses demostró diferencia entre las plantas a raíz desnuda y en tierra en ninguna de las dos localidades, pero el crecimiento del cadam fué superior al de pino de Honduras. El crecimiento de la primavera fué prácticamente nulo porque no se adaptó al lugar de plantación.

Los datos indican que bajo las condiciones de este estudio no es indispensable que los arbolitos de pino hondureño, cadam y primavera lleven consigo el material de la maceta al tiempo de plantarse.

Honduras pine (Pinus caribaea Morelet var. hondurensis); cadam (Anthocephalus cadamba (Roxb.) Miq.), a fast growing hardwood; and primavera (Cybistax donnell-smithii (Rose) Seibert), a valuable furniture wood, are three species being tested widely by the Institute of Tropical Forestry.

For experimental plantings these species are raised in polyethylene plastic pots. For larger plantations probably the latter two species could be raised in ordinary nursery beds and planted barerooted. Although in the tropics pine has generally been planted potted survival of barerooted seedlings may prove satisfactory if seedlings are planted when not in a flush of growth and with minimum root disturbance.

The cadam seedlings tested had been growing in mixed nursery soil in small polyethylene plastic bags, the primavera in sphagnum moss in large plastic bags, and the pine seedlings in decomposed sawdust in small plastic bags. The cadam and



primavera were 1 to 1-1/2 feet tall and the pine 1/2 to 1 foot tall. None of the pine seedlings used were in flush.

Twenty seedlings of each species were planted at each of two localities: a valley at about 150 feet elevation in a tropical humid climate with an average annual rainfall of 100 inches, and a nearby mountain area at about 1500 feet elevation with a somewhat higher rainfall. At both localities the soil is a heavy clay.

Planting was in February, the driest month of the year, and was followed by 1 or 2 months of dry weather. At time of planting the soil was moist, but the air was hot and dry.

Half of each group was planted without disturbance of the soil around the roots. For the other half the soil was removed so that the seedlings were planted barerooted. Thus each species was planted in two 5-tree plots, one bagged and one barerooted, on each of two blocks at each of the two locations. For the "barerooted" pines the soil was deposited in the planting hole to insure the presence of mycorrhizal inoculum.

#### Survival

After six months survival of pine was 100% at both locations, barerooted or bagged, Table 1. Cadam was about the same. Survival of primavera was 100% on the mountain but was less at low elevation. Primavera deaths may have been caused by weed competition or adverse site; all primavera died within two years.

#### Growth

Twenty-three weeks after planting there were no differences in height growth attributable to planting method, but cadam growth exceeded that of pine.

Table 1.--Survival at 6 months.  
Supervivencia a los 6 meses.

Species	Elevation	Bagged	Barerooted
		Percent	Percent
Honduras pine	low	100	100
	high	100	100
	Average	100	100
Cadam	low	100	90
	high	100	100
	Average	100	95
Primavera	low	50	90
	high	100	100
	Average	75	95

After 23 months, Table 2, differences are apparent, but when the effects of species-site interaction are removed there remains no significant difference in growth between the planting methods. Cadam continued to outgrow pine. The biggest within-species difference, between the growth of the barerooted cadam in the valley and on the mountain, was due to differences in microsite rather than actual growth differences between the two localities.

### Conclusions

With a minimum of root disturbance barerooted pine seedlings which were not in flush at time of planting survived as well as bagged seedlings. Removal of the potting material from the seedlings planted barerooted was done at the hole at time of planting. Therefore root loss and disturbance were considerably less than in the usual lifting from a bed followed by roughly bundling seedlings together. Similarly, the survival of cadam and primavera were not adversely affected by removal of potting material prior to planting. No significant differences in early height growth between trees planted bagged and barerooted were found.

Table 2.--Average 23-month height growth of seedlings.  
Promedio del crecimiento en altura durante  
23 meses.

Species	Elevation	Bagged	Bareroot
		<u>Feet</u>	<u>Feet</u>
Honduras pine	low	1.0	1.3
	high	2.0	1.7
Cadam	low	6.5	10.3
	high	4.5	4.1